

## Ch 6 Similarity

### 6.1 Ratios, Proportions, and the Geometric Mean

Ratio--compares 2 numbers

$$a:b$$

$$\frac{a}{b}$$

$$b \neq 0$$

Example  
1860 students  
310 athletes

Athlete: student ratio

$$310 : 1860$$

$$\frac{310}{1860} \quad 1:6$$

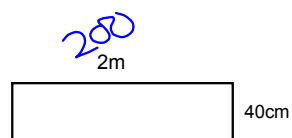
Athlete: non-athlete ratio

$$310 : 1550$$

$$1:5$$

Must convert to the same unit!

Kilo meters  
Hecto meters  
Deci meters  
Base  
Deci centi milli



L:W

$$\frac{200}{40} = \frac{5}{1}$$

Simplify

2 ft : 20 in

 $6:5$ 

12 ft : 5 yd (3ft = 1yd)

 $4:5$ 

The ratio of 2 supplementary angles is 4:5.  
What are the measures of the angles?

$$4x + 5x = 180$$

$$9x = 180$$

$$x = 20$$

$$80^\circ \quad 100^\circ$$

The ratio of the angles in a triangle are 2:3:4.  
What are the measures of the angles?

$$2x + 3x + 4x = 180$$

$$9x = 180$$

$$x = 20$$

$$40^\circ \quad 60^\circ \quad 80^\circ$$

The ratio of the sides of a triangle are 5:12:13.  
The perimeter is 90 cm. What are the lengths of the sides?

$$30x = 90$$

$$x = 3$$

$$15\text{ cm}, 36\text{ cm}, 39\text{ cm}$$

Do:

1. The ratio of the angles in a triangle are 1:5:6.  
Find the angles.

2. The ratio of the angles in a triangle are 3:5:7.  
Find the angles.

Proportion—equation stating 2 ratios =

$$\frac{a}{b} = \frac{c}{d}$$

Cross products  $a \cdot d = b \cdot c$

“a is to b as c is to d”

### Cross Products Property

Product of Means = Product of the extremes

examples:

$$\cancel{6x} \frac{6}{18.2} = \frac{9}{y}$$

$$6y = 9(18.2)$$

$$y = 27.3$$

$$\frac{4x-5}{3} = -\frac{26}{6}$$

$$x = -2$$

Geometric Mean

*x is the g<sup>mean</sup>*

$$\frac{a}{x} = \frac{x}{b}$$

$$x^2 = ab$$

$$x = \pm \sqrt{ab}$$

Positive

$$x = \sqrt{ab}$$

Find the geometric mean between 24 and 48.

$$\frac{24}{x} = \frac{x}{48}$$

$$x^2 = 24 \cdot 48$$

$$x = \sqrt{24 \cdot 48}$$

$$x = 24\sqrt{2}$$

$$\begin{array}{c} 24 \quad 48 \\ \swarrow \quad \searrow \\ 24 \quad 2 \end{array}$$

Find the geometric mean between 12 and 27.

$$\frac{12}{x} = \frac{x}{27}$$

$$x = 18$$

Find the geometric mean between 16 and 18.

HW  
p360-363 #s 3-5, 7-9, 14,  
15, 18-20, 29, 30, 34, 35,  
60, 65